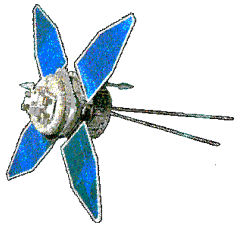

Plasma flows observed by Interball at high-latitude magnetopause

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Introduction

- **High-latitude magnetopause was studied with Heos-2 satellite**
  - **LLBL, mantle and entry layer were separated**

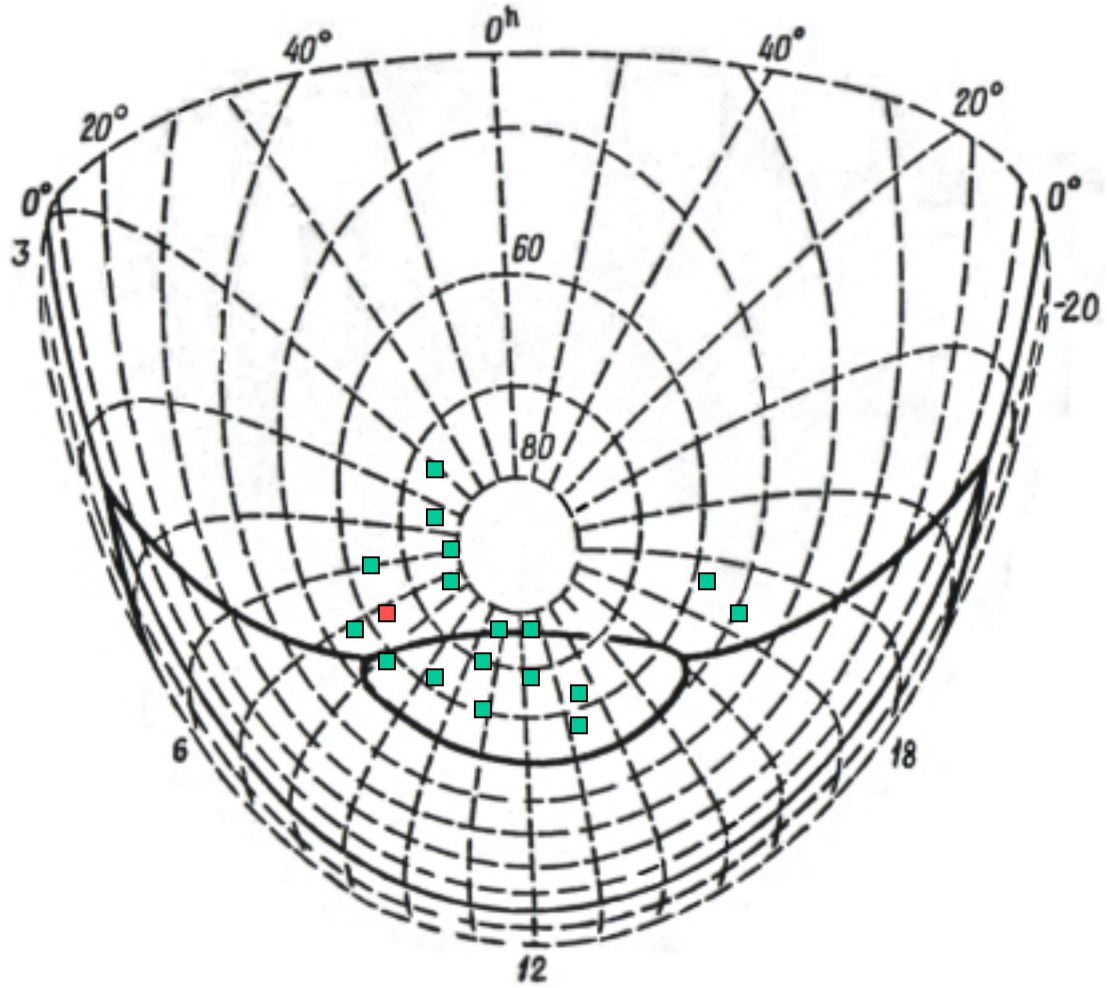
    Haerendel et al., 1978

- **New observations of Interball Tail and Polar in ISTP era**

- **High-latitude magnetopause region is less studied than low-latitude one**

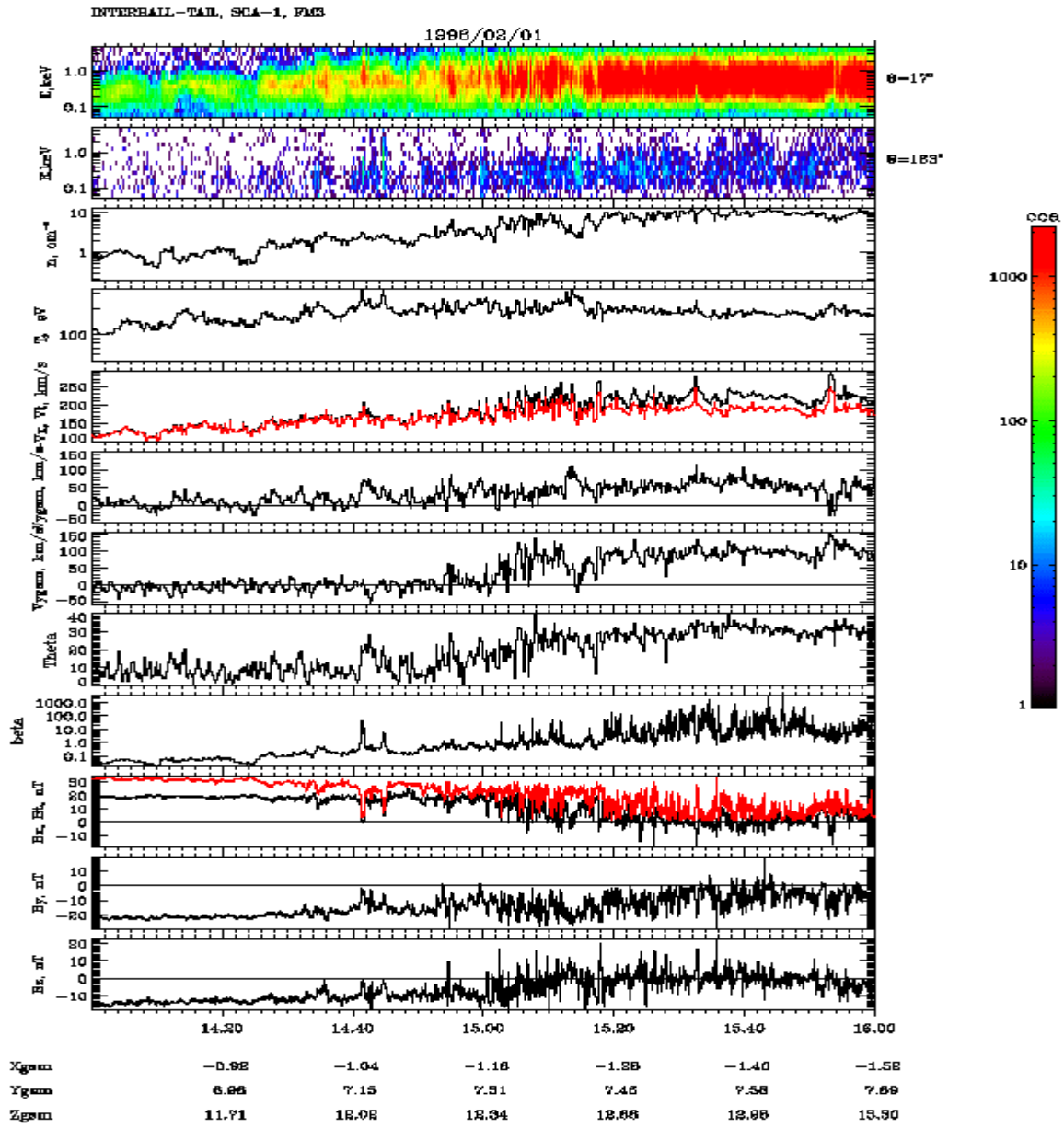
- **1996 Interball-Tail sample with high-time resolution:**

  11 lobe crossings and 9 entry layer crossings

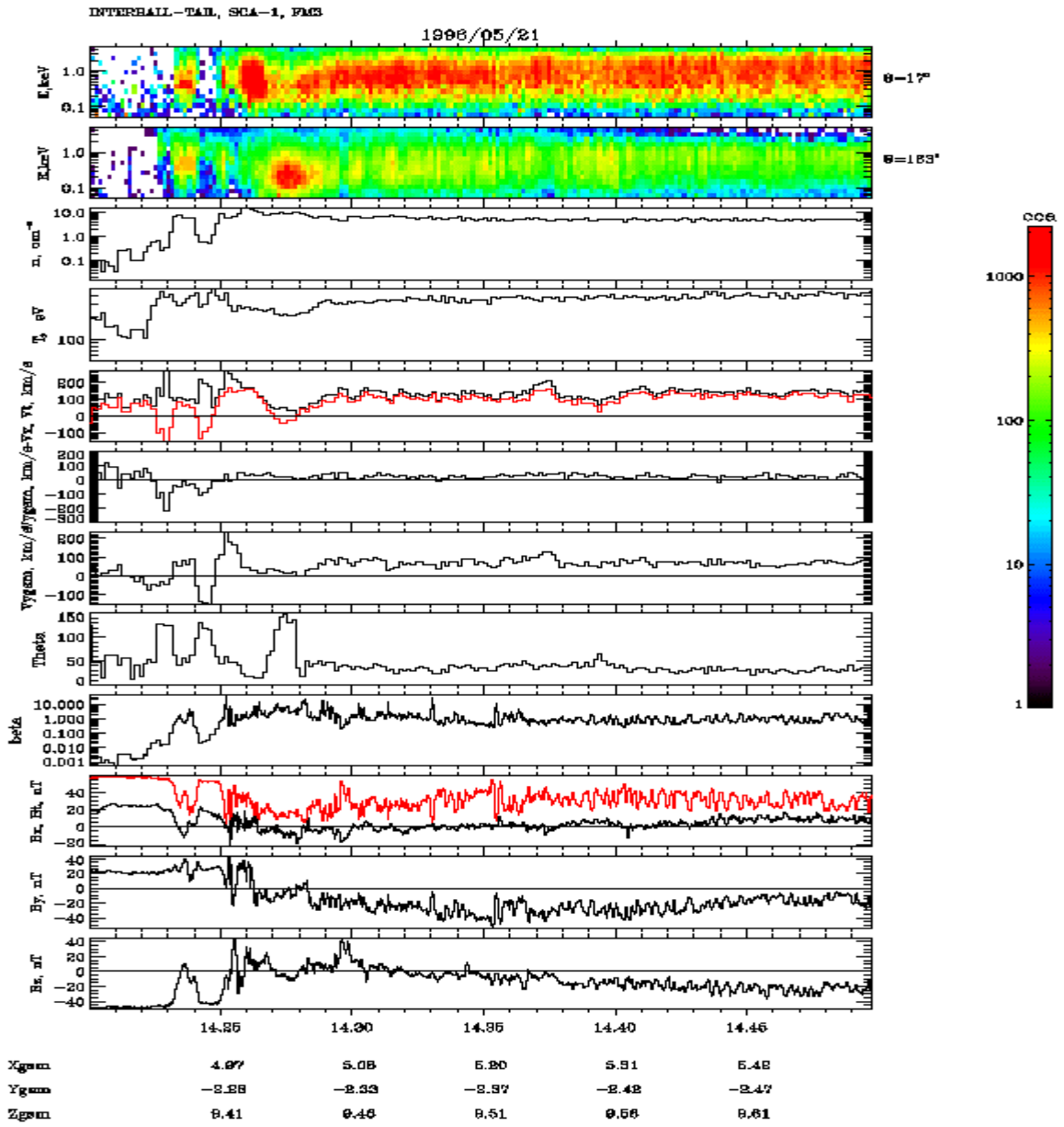


Magnetopause map

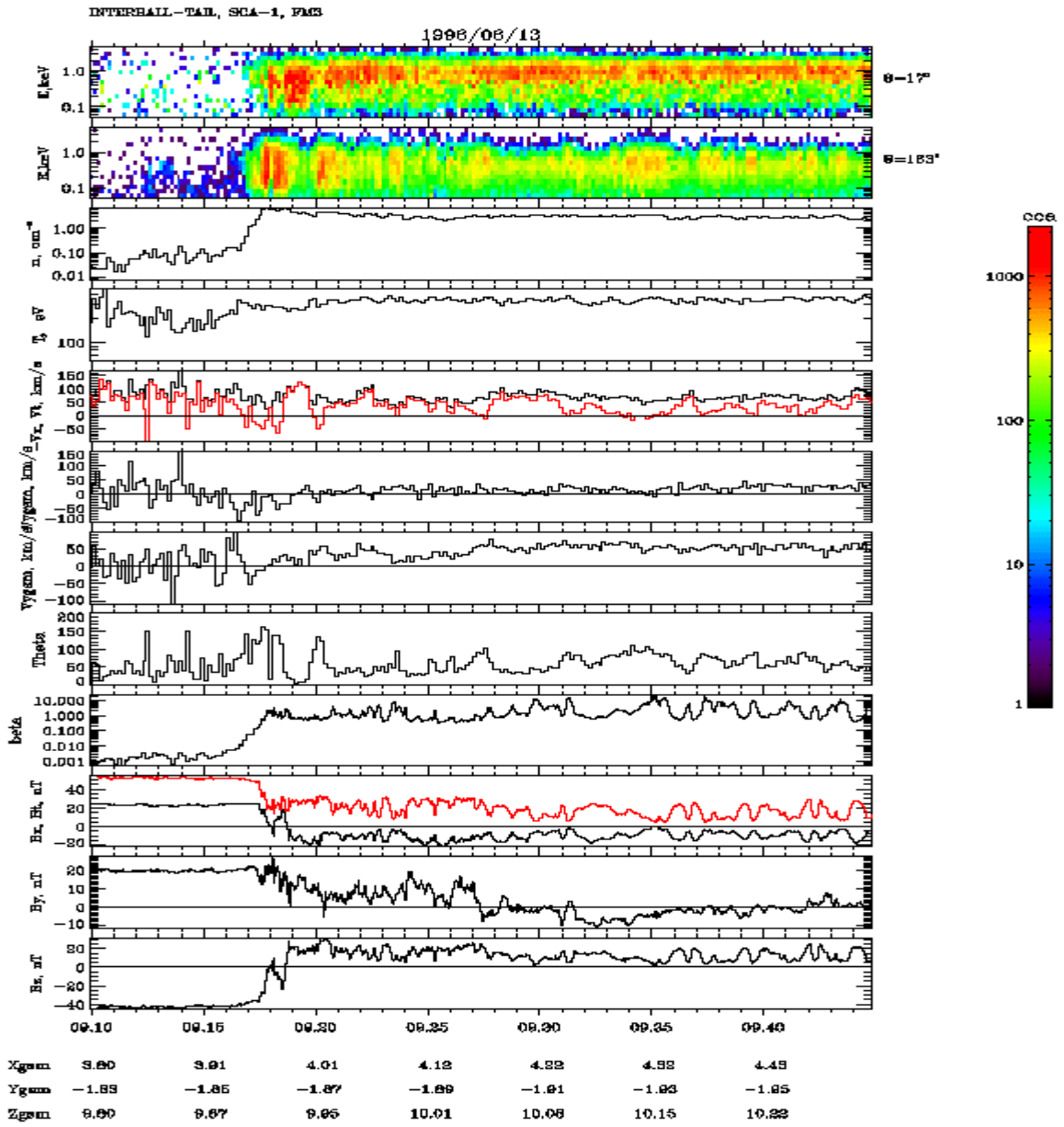
Case of the mantle at variable IMF B_z



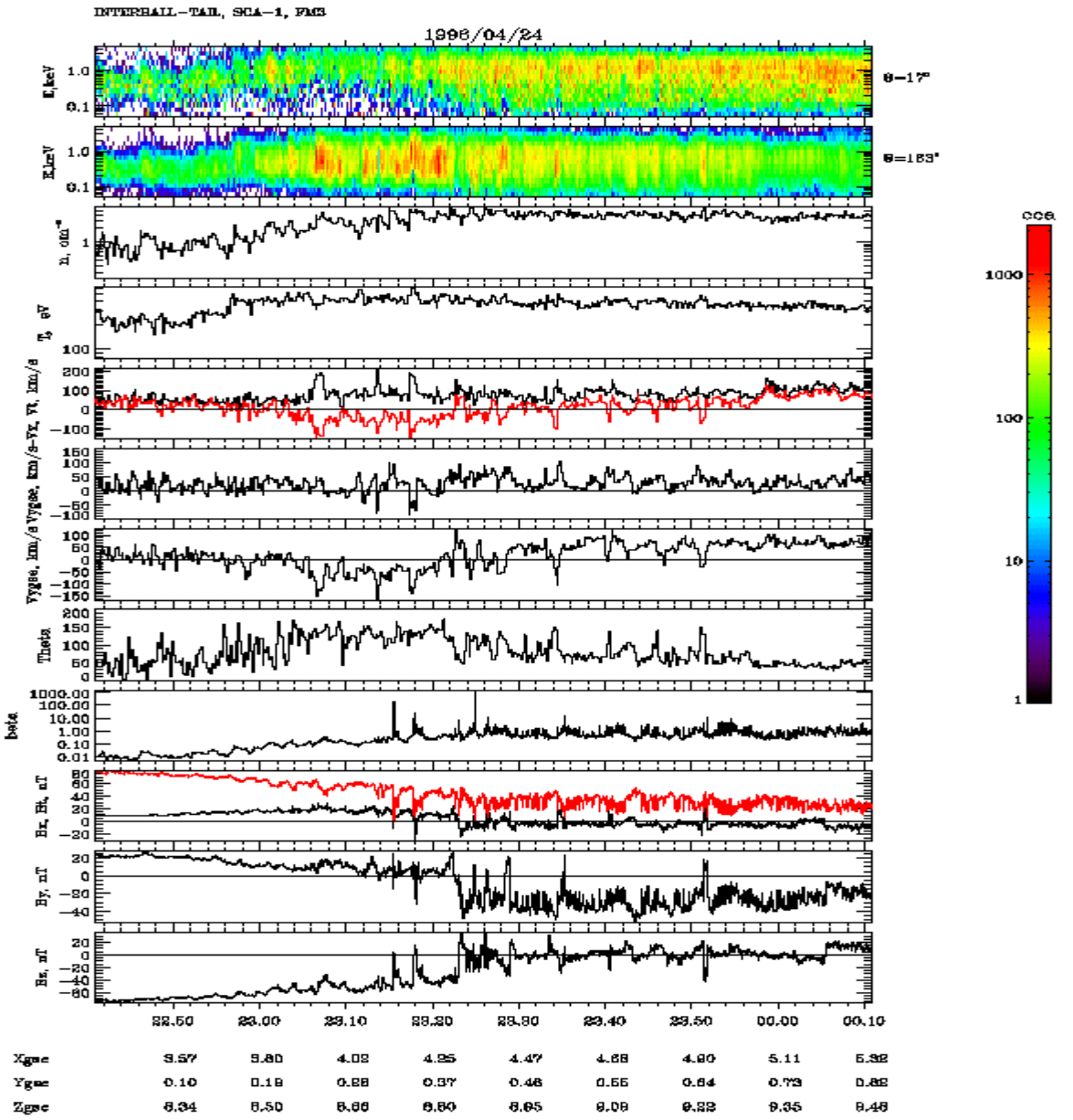
Magnetopause at the tail lobe during the IMF change from Northward to Southward. Anomalous plasma flow is seen in the magnetosheath close to the magnetopause.



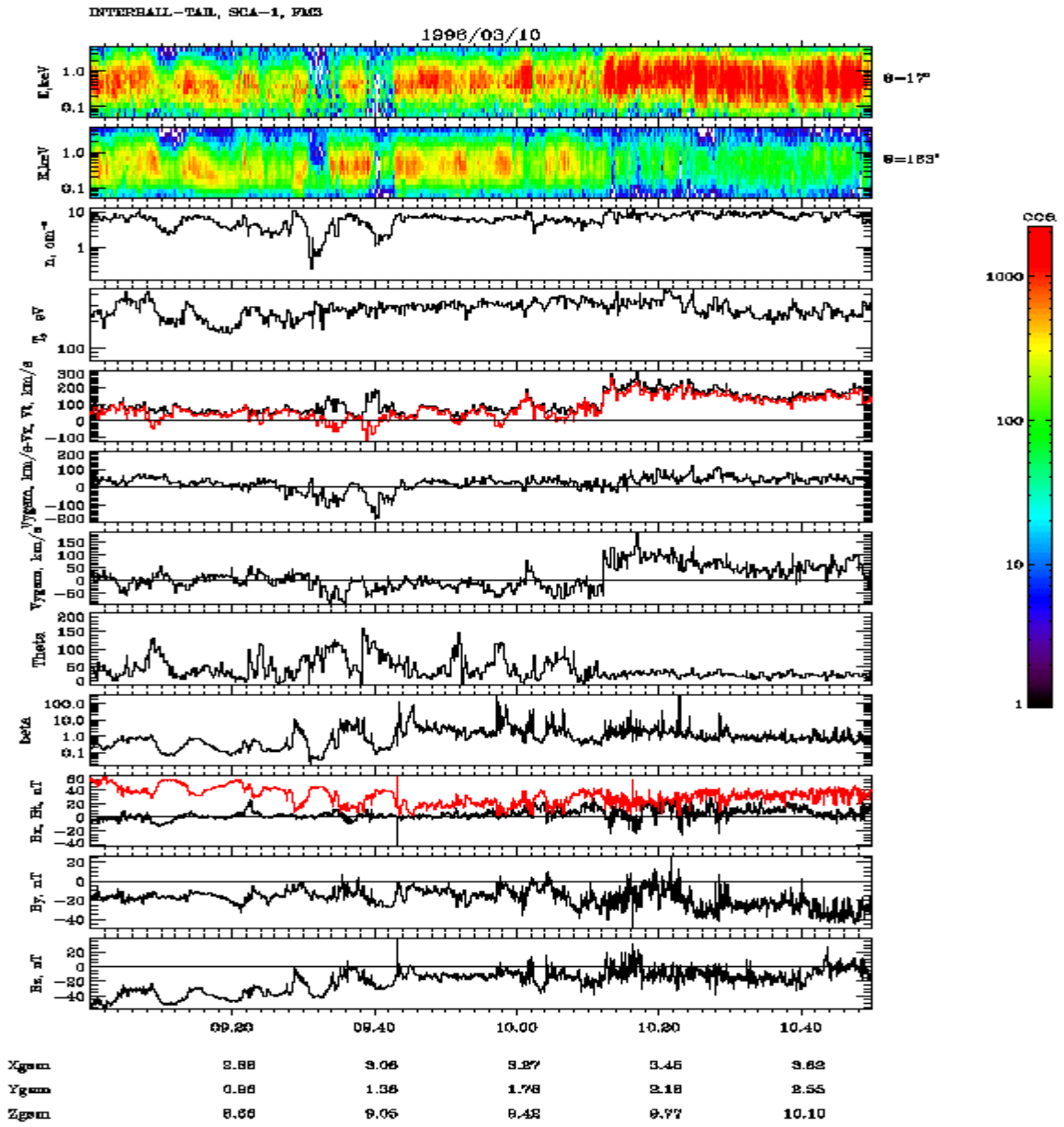
Anomalous plasma flows at lobe magnetopause for Northward IMF

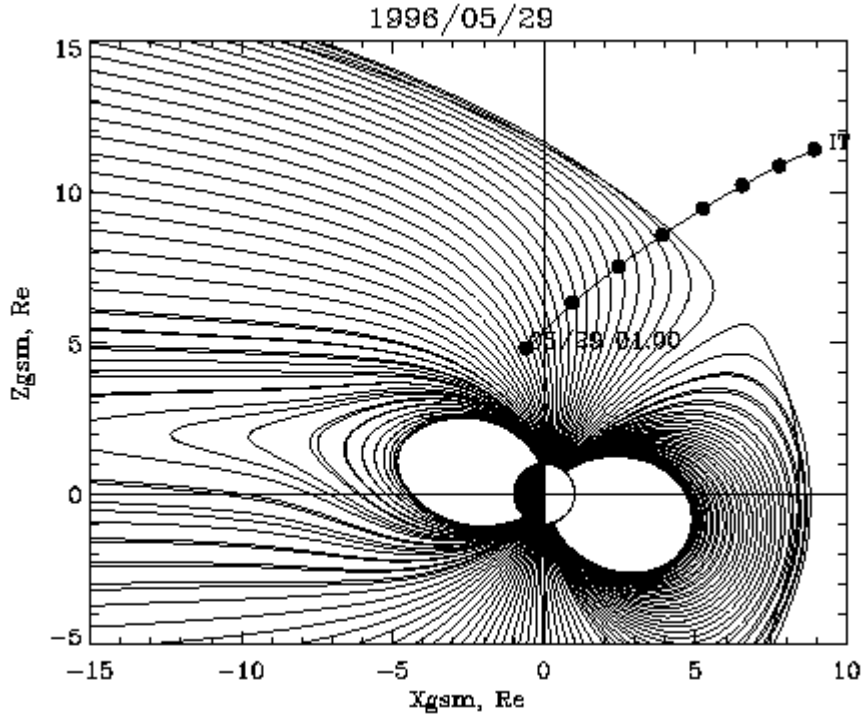


Higher-latitude part of entry layer for Southward IMF



Lower-latitude part of of the entry layer: disturbed flows and high density.





Tsyganenko model and Interball Tail trajectory
for case of 05.29.1996

Overview of 05.29.1996 lobe magnetopause crossing. Reconnected flux tube within magnetopause current layer is shown by 2 vertical lines.

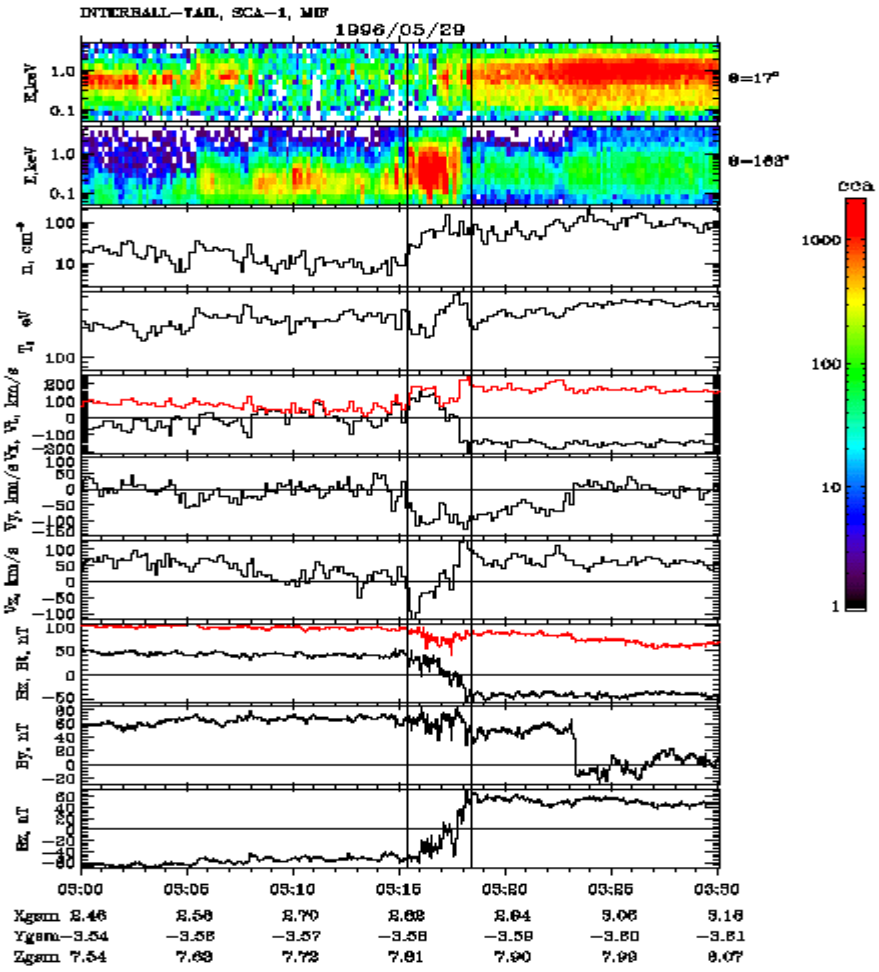
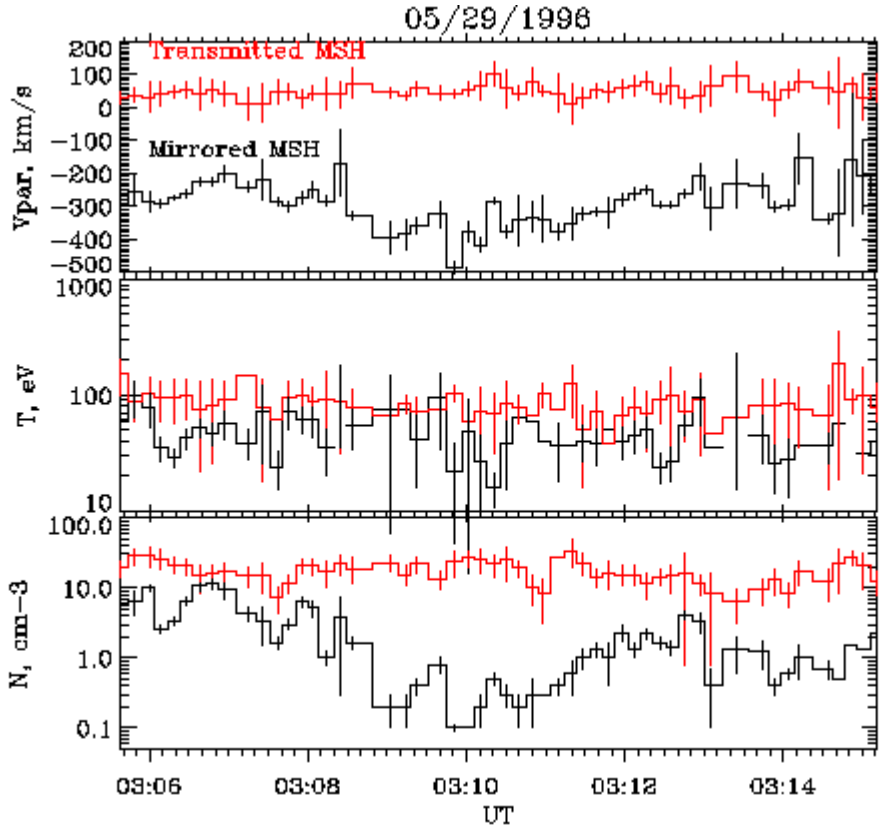
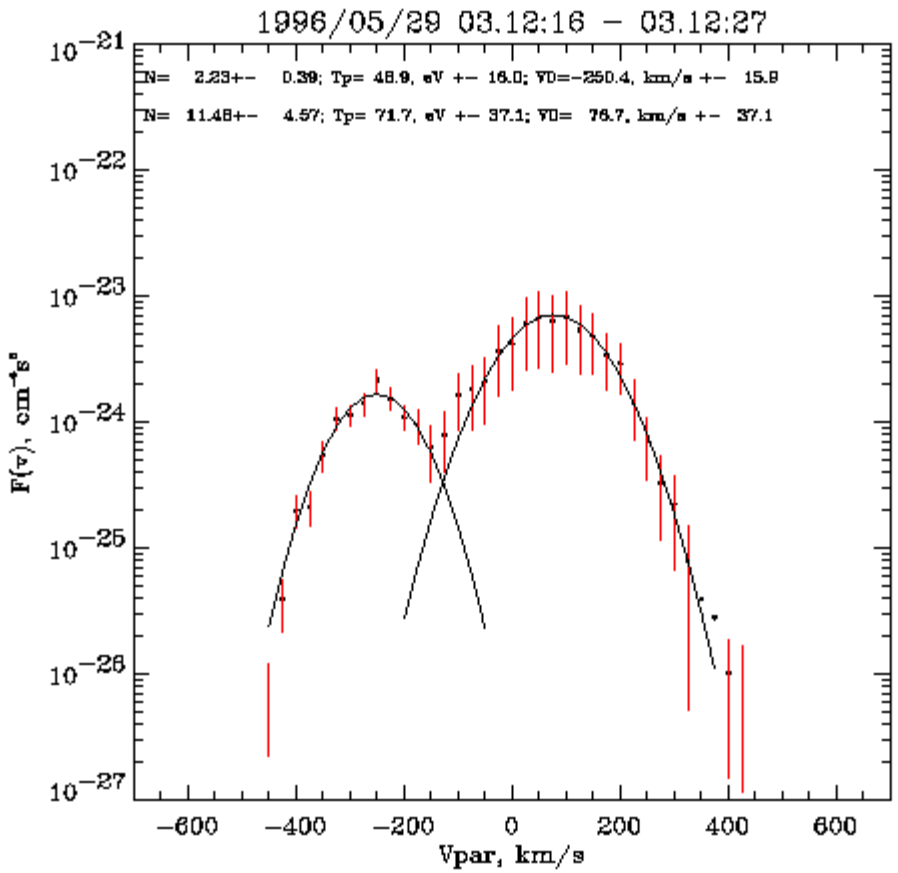


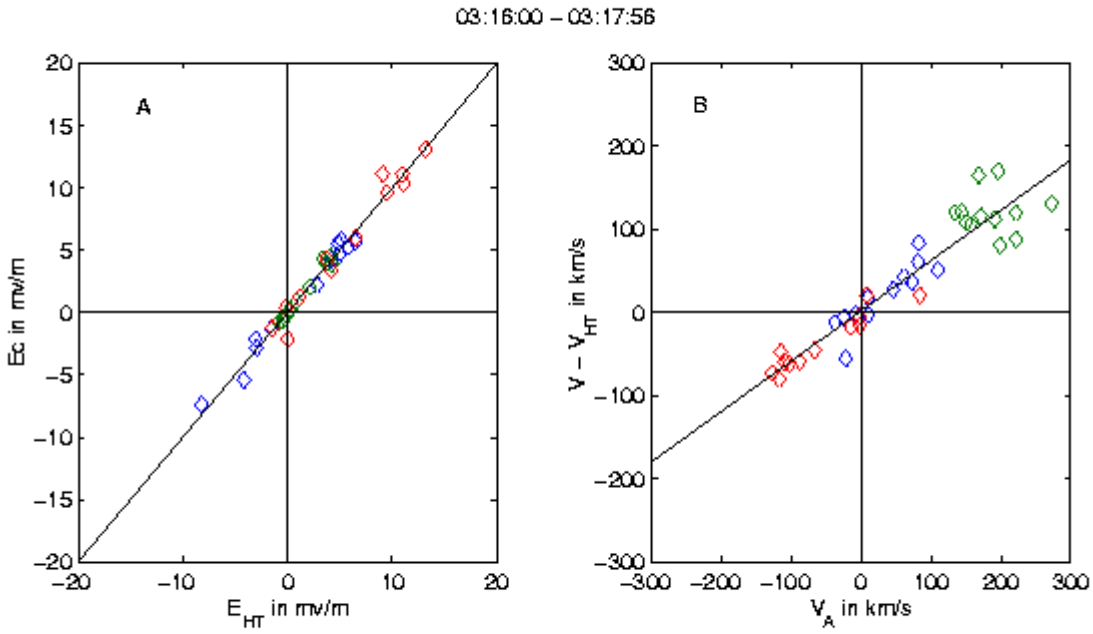
Figure 3



Two-component ion flow within the boundary layer.

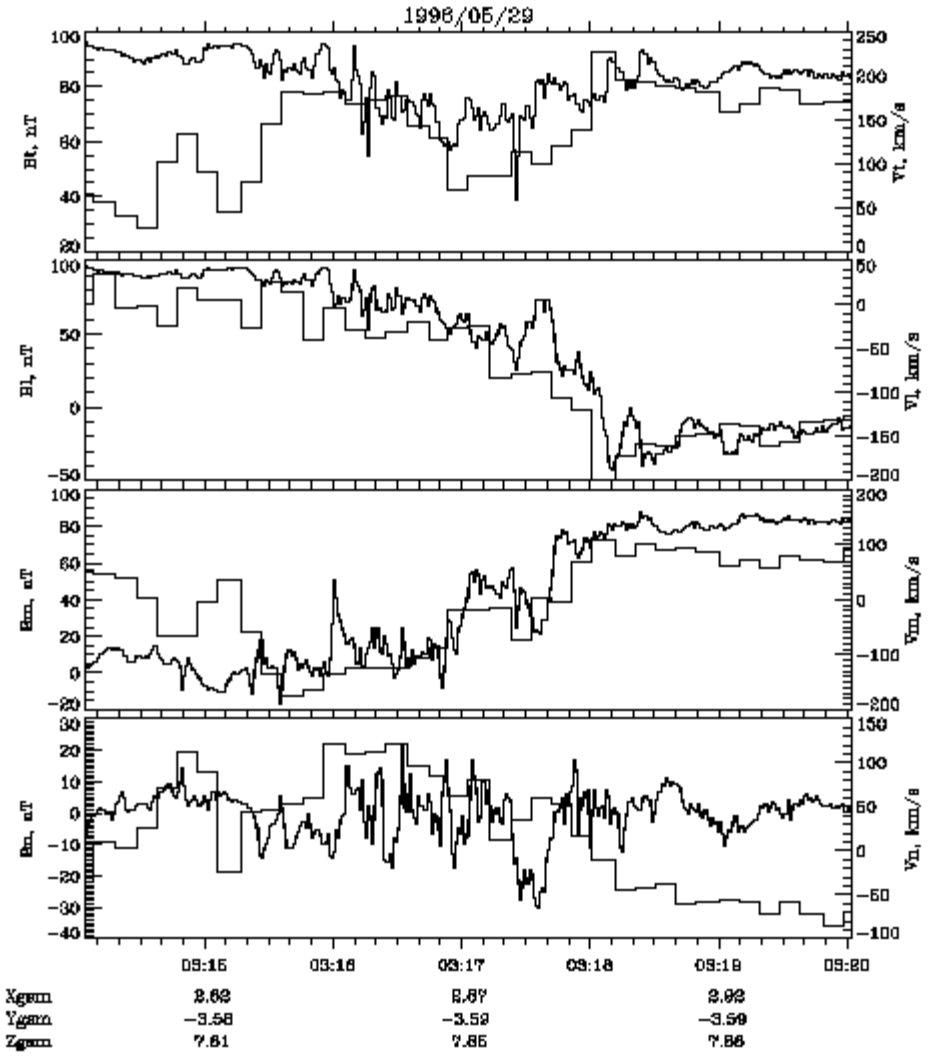


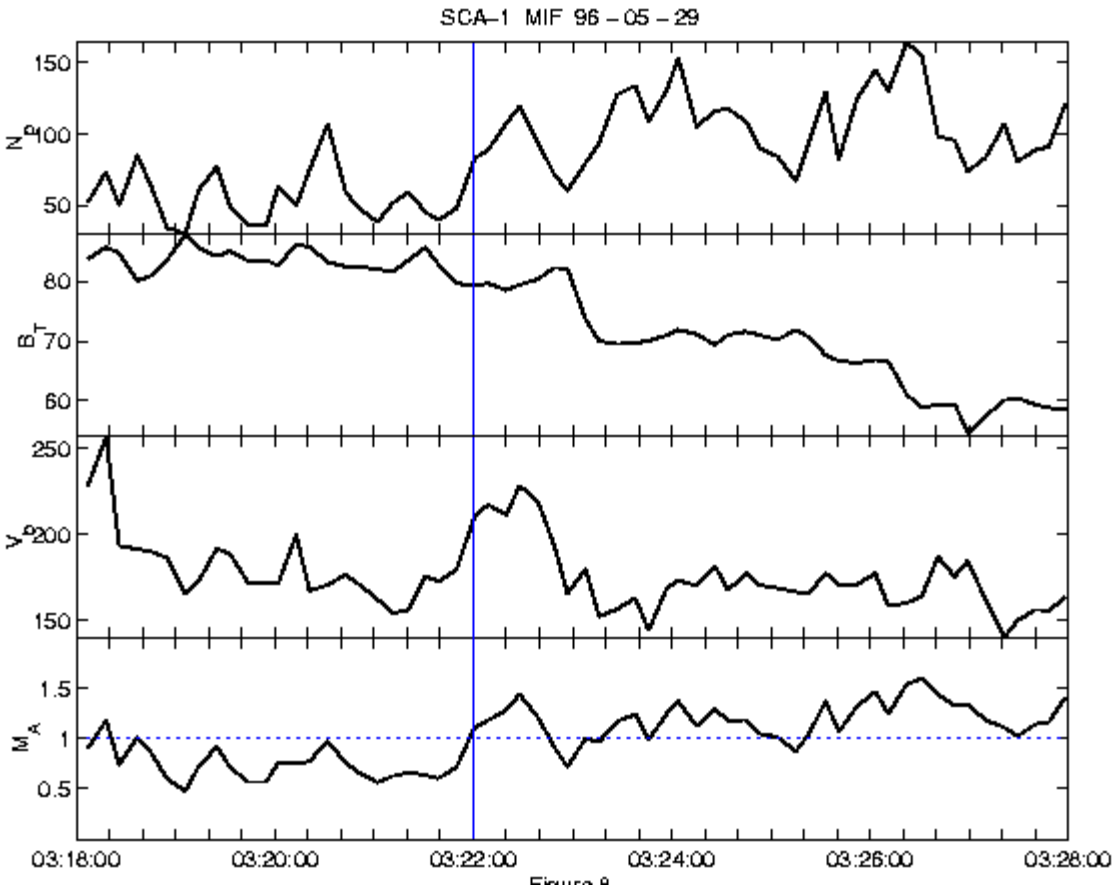
Maxwellian fit to two ion components



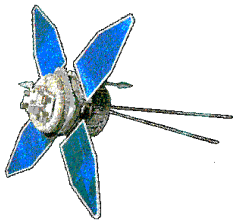
The scatter plot of electric field for calculated de Hoffman-Teller frame (left) and relation between local Alfvenic speed and plasma speed in the de Hoffman-Teller frame (Walen relation, right) for magnetopause current layer on May 29, 1996.

Plassma (square line) and magnetic field structure of magnetopause in the normal coordinate system





Subalfvenic flow within depletion layer (before 03:22 UT).



Preliminary conclusions from Interball Tail data

- **Lobe region**
  - **For southward IMF**
    - **Smooth plasma boundary (mantle)**
    - **Moderate activity at magnetopause**
  - **For northward IMF**
    - **Sharp plasma boundary**
    - **Subalfvenic magnetosheath flow**
    - **Very strong activity at and near magnetopause**
      - **Reconnected flux tube was observed at magnetopause**
      - **Anomalous magnetosheath flows**
- **Entry layer region**
  - **Very large variations of number density and velocity at magnetopause**
  - **Northern part reminds mantle for southward IMF**
  - **Number density in southern part of exterior cusp is a large fraction of magnetosheath number density**